

REMARKS

Reconsideration and allowance of the above referenced application are respectfully requested.

Claims 1, 5, 7, 9, 17-20 and 22 stand rejected under 35 USC 102(b) as allegedly being anticipated by Basri et al.'s Clustering Appearances of 3D Objects (hereinafter "3D Objects"). This contention is respectfully traversed.

I. 3D Objects does not use models and training images.

Claim 17 requires analyzing a plurality of training images to find selected features, establishing correspondence between the parts, and forming a model based on homologous parts. 3D Objects does not disclose doing any of this. The rejection refers to the first paragraph of 3d Objects which talks, in the background, about constructing models of classes in individual objects. However, 3D Objects teaches nothing about using techniques for training and forming models. In fact, it is clear that 3D Objects simply attempts to describe the concept of image clustering to determine similarities between images. For example, section 5.1 describes the similarities between the images, and describes how the similarity measure is detected. The first full paragraph in the right column of the page of the article that includes section 5 explains that the distance between any two images should be nonnegative; and vanishes for

identical images. This describes the similarity between the images. Throughout the 3D Objects reference, they describe characterizing the images, and in the conclusion they certainly do describe how the images may be considered as sets. The entire technique is based on the clustering algorithm, but nowhere does it teach or suggest the claimed features of training images, correspondence between homologous parts among the training images, or automatically forming a model. In fact, nowhere does the 3D Objects reference teach using any model with their teaching.

The rejection states that the 3D Objects reference teaches "ignoring other features that are not in the set of homologous parts". This is based on the statement in the conclusion that only similarities between pairs of images that resemble each other matter for the computation. With all due respect, this has nothing to do with the features in the images as claimed. This cited section describes how not all of the 1700 images need to be computed: only those which are somehow similar. For example, the left column of the page, including section 6 third paragraph down, describes using the k -nearest neighbor algorithm to find the most similar images. This is about similarity of images, not similarity of parts. This certainly teaches nothing about features within images in a training set, as claimed. There is no teaching or suggestion of finding features in an

image and ignoring features that are not within the set of homologous parts. Rather, the 3D Objects reference teaches finding the nearest neighbors using the clustering algorithm, but does not teach ignoring features that are not within the set of homologous parts.

Claim 17 should hence be allowable along with the claims that depend therefrom.

Claim 18 defines, for example, vector quantization to reduce the total number of detected features. The rejection attempts to read the eigenvectors as vector quantization. There is no teaching or suggestion of vector quantization of the features in 3D Objects. Section 4.1 describes looking at the eigenvectors and eigenvalues of the scatter matrix or equivalent. This is used to detect or estimate the dimensionality of the surface, see the last paragraph prior to 4.2. There is no teaching or suggestion of using the eigenvalues to reduce the total number of detected features. In fact, vector quantization and representing something by its eigenvalues are different.

The rejection states in rejecting Claim 19, that the estimating the relative orientation of section 4.2 discloses probabilistically estimating which of the features are most informative. Note that 4.2 was concerned with whether the two images are rotationally skewed relative to one another. 4.2

suggests to "recover the angles" in order to estimate this relative orientation. This has nothing to do with probabilistically estimating which of the plurality of features are most informative for the model. Rather this is completely different since it simply determines relative orientation of the two images.

Claim 22 describes forming a model using a plurality of recognized parts. The 3D Objects reference describes that there is prior art which forms models, but teaches nothing about forming a model using that specific technique.

Therefore, these claims should be allowable.

Claim 1 should be allowable for similar reasons. The 3D Objects reference does not teach forming a model using selected features, as described above. The 3D Objects reference does not teach that these features are formed by vector quantizing features, clustering among the features to reduce the total number of determine features, and wherein that also includes moving the features to combine similar features. There is no showing that the eigenvectors that are used by the reference are in some way quantized. Moreover, Claim 1 requires that similar features which are spatially offset are combined, something that is again not suggested by the cited prior art.

The dependent claims should be allowable for similar reasons to those discussed above with respect to the respective

independent claims as well as on their own merits.

Claim 6 stands rejected over 3D Objects in view of Burl's Recognition of Planar Object Classes (hereinafter "Burl"). Claims 8, 11-12 and 15-16 stand rejected over 3D Objects in view of Burl and in view of Jojic et al. All of these contentions are further respectfully traversed. Burl does show a joint probability function, but teaches nothing about using a joint probability function for the features claimed.

Initially, Claim 6 should be allowable by virtue of its dependency, see the arguments given above.

Burl certainly does show a joint probability function, and Jojic et al. shows expectation maximization. However, neither of these teach or suggest using only the similar quantized features to form a model. As described above, nothing in the 3D Objects teaches anything about forming a model.

Claim 16 should be allowable for similar reasons: specifically nothing in the cited prior art teaches forming a model using statistically most relevant features. Also, as described above, the cited prior art does not teach spatially moving features to group features which are different but spatially separated.

Claim 23 stands rejected over Burl in view of Matthews. Claim 23 recites analyzing whether parts are from a foreground or background. The rejection states that Matthews suggest this.

However, column 4 of Matthews describes how its foreground and background clusters are used. Matthews teaches that the lesser luminance parts are used for forming the foreground.

Claim 23 requires forming a model using only the foreground. Hence, if Matthews' teaching were used, the model would be formed only based on the lesser luminance parts of the image. This makes no sense. This demonstrates that there is no teaching or suggestion in the hypothetical combination of Burl in view of Matthews to form a model based only on the foreground, and not on the background.

Moreover, Claim 23 defines the variables represent the likelihood that the parts in the matrix from a foreground or background. Matthews simply states that high luminance is background, low luminance is foreground. Nothing in Matthews teaches anything about any probabilistic assessment.

The 3D Objects reference is cited to show forming a model based on parts of images that resemble each other. As described above, 3D Objects teaches nothing about any model whatsoever.


Claim 26 should be even further allowable, as it defines that the foreground parts are instances of the target object class. As described above, Matthews teaches that the foreground parts are the lower luminance parts of the image. Therefore, Claim 26 should be additionally allowable.

It is believed that all of the pending claims have been addressed in this paper. However, failure to address a specific rejection, issue or comment, does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above are not intended to be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Applicants ask that all claims be allowed. No fee is believed to be due, however please apply any applicable charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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